



11283-013001.ST25.txt
SEQUENCE LISTING

<110> Kuramitsu, Seiki
Yokoyama, Shigeyuki
<120> Novel DNA Repair Enzymes, Nucleic Acids Encoding DNA Repair Enzymes And Methods of Using Them
<130> 11283-013001/PH1261 US
<140> US 09/938,901
<141> 2001-08-24
<150> JP 47762/2001
<151> 2001-02-23
<160> 65
<170> PatentIn version 3.3
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<220>
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tcc gag gtc ctt ctg cag cag acc cgg gtg gag cag gcc ctc ccc tat Ser Glu Val Leu Leu Gln Gln Thr Arg Val Glu Gln Ala Leu Pro Tyr 35 40 45	144
tac cgc cgc ttt ctg gag cgc ttt ccc acc ctg aag gcc ctg gcc gcg Tyr Arg Arg Phe Leu Glu Arg Phe Pro Thr Leu Lys Ala Leu Ala Ala 50 55 60	192
gct tcc ctg gaa gag gtc ctt agg gtc tgg cag ggg gcg ggc tac tac Ala Ser Leu Glu Glu Val Leu Arg Val Trp Gln Gly Ala Gly Tyr Tyr 65 70 75 80	240
cgg cgg gcg gaa cac ctc cac cgc ctg gcc cga agc gtg gag gag ctt Arg Arg Ala Glu His Leu His Arg Leu Ala Arg Ser Val Glu Glu Leu 85 90 95	288
ccc ccc agc ttc gcc gag ctt cgg ggg ctt cct ggt ctc ggg cct tac Pro Pro Ser Phe Ala Glu Leu Arg Gly Leu Pro Gly Leu Gly Pro Tyr 100 105 110	336
acc gcg gcg gcg gtg gcc tcc atc gcc ttc ggg gag cgg gtg gcg gcg Thr Ala Ala Ala Val Ala Ser Ile Ala Phe Gly Glu Arg Val Ala Ala 115 120 125	384

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gtg gac ggg aac gtc cg ^g agg gtc ctc tcc cgc ctc ttc gcc cg ^g gaa	432
Val Asp Gly Asn Val Arg Arg Val Leu Ser Arg Leu Phe Ala Arg Glu	
130 135 140	
agc ccc aag gag aag gag ctt ttc gcc ctc gcc cag ggc ctc ctc ccc	480
Ser Pro Lys Glu Lys Glu Leu Phe Ala Leu Ala Gln Gly Leu Leu Pro	
145 150 155 160	
gag ggc gtg gac cc ^g ggg gtg tgg aac cag gcc ctc atg gag ctc ggg	528
Glu Gly Val Asp Pro Gly Val Trp Asn Gln Ala Leu Met Glu Leu Gly	
165 170 175	
gcc acg gtc tgc ctg cc ^g aaa cc ^g ccc cgt tgc ggg gcc tgc ccc cta	576
Ala Thr Val Cys Leu Pro Lys Arg Pro Arg Cys Gly Ala Cys Pro Leu	
180 185 190	
ggg gcc ttc tgc cc ^g ggg aag gag gcc ccc ggg cgc tac ccc gcg ccc	624
Gly Ala Phe Cys Arg Gly Lys Glu Ala Pro Gly Arg Tyr Pro Ala Pro	
195 200 205	
agg aag cgc cc ^g cc ^g aag gag gag cgc ctc gtc gcc ctc gtc ctc ctc	672
Arg Lys Arg Arg Ala Lys Glu Glu Arg Leu Val Ala Leu Val Leu Leu	
210 215 220	
ggg cc ^g aag ggg gtg cac ctg gaa agg ctt gag ggg cgc ttc cag ggc	720
Gly Arg Lys Gly Val His Leu Glu Arg Leu Glu Gly Arg Phe Gln Gly	
225 230 235 240	
ctc tac ggc gtc ccc ctc ttt ccc cct gag gag ctt ccc ggg cgg gag	768
Leu Tyr Gly Val Pro Leu Phe Pro Pro Glu Glu Leu Pro Gly Arg Glu	
245 250 255	
gc ^g gcc ttc ggg gtg agg tct agg ccc cta ggc gag gtg cgc cac gcc	816
Ala Ala Phe Gly Val Arg Ser Arg Pro Leu Gly Glu Val Arg His Ala	
260 265 270	
ctc acc cac cc ^g agg ctt cgc gtg gag gtg cgg ggg gcc ctt tgg gaa	864
Leu Thr His Arg Arg Leu Arg Val Glu Val Arg Gly Ala Leu Trp Glu	
275 280 285	
ggg gag ggg gag gac cc ^g tgg aag agg ccc cta ccc aag ctc atg gag	912
Gly Glu Gly Glu Asp Pro Trp Lys Arg Pro Leu Pro Lys Leu Met Glu	
290 295 300	
aag gtg ctc cgc aag gc ^g ctt ccc ctc ctc gct cat gc ^g ggc gta gtc	960
Lys Val Leu Arg Lys Ala Leu Pro Leu Leu Ala His Ala Gly Val Val	
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ccc ctc cc ^g gac gca	975
Pro Leu Pro Asp Ala	
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 <212> PRT
 <213> Thermus thermophilus

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Arg Pro Leu Pro Trp Arg Gly Glu Lys Asp Pro Tyr Arg Val Leu Val
20 25 30

Ser Glu Val Leu Leu Gln Gln Thr Arg Val Glu Gln Ala Leu Pro Tyr
35 40 45

Tyr Arg Arg Phe Leu Glu Arg Phe Pro Thr Leu Lys Ala Leu Ala Ala
50 55 60

Ala Ser Leu Glu Glu Val Leu Arg Val Trp Gln Gly Ala Gly Tyr Tyr
65 70 75 80

Arg Arg Ala Glu His Leu His Arg Leu Ala Arg Ser Val Glu Glu Leu
85 90 95

Pro Pro Ser Phe Ala Glu Leu Arg Gly Leu Pro Gly Leu Gly Pro Tyr
100 105 110

Thr Ala Ala Ala Val Ala Ser Ile Ala Phe Gly Glu Arg Val Ala Ala
115 120 125

Val Asp Gly Asn Val Arg Arg Val Leu Ser Arg Leu Phe Ala Arg Glu
130 135 140

Ser Pro Lys Glu Lys Glu Leu Phe Ala Leu Ala Gln Gly Leu Leu Pro
145 150 155 160

Glu Gly Val Asp Pro Gly Val Trp Asn Gln Ala Leu Met Glu Leu Gly
165 170 175

Ala Thr Val Cys Leu Pro Lys Arg Pro Arg Cys Gly Ala Cys Pro Leu
180 185 190

Gly Ala Phe Cys Arg Gly Lys Glu Ala Pro Gly Arg Tyr Pro Ala Pro
195 200 205

Arg Lys Arg Arg Ala Lys Glu Glu Arg Leu Val Ala Leu Val Leu Leu
210 215 220

Gly Arg Lys Gly Val His Leu Glu Arg Leu Glu Gly Arg Phe Gln Gly
225 230 235 240

Leu Tyr Gly Val Pro Leu Phe Pro Pro Glu Glu Leu Pro Gly Arg Glu
245 250 255

Ala Ala Phe Gly Val Arg Ser Arg Pro Leu Gly Glu Val Arg His Ala
260 265 270

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Leu Thr His Arg Arg Leu Arg Val Glu Val Arg Gly Ala Leu Trp Glu
 275 280 285

Gly Glu Gly Glu Asp Pro Trp Lys Arg Pro Leu Pro Lys Leu Met Glu
 290 295 300

Lys Val Leu Arg Lys Ala Leu Pro Leu Leu Ala His Ala Gly Val Val
 305 310 315 320

Pro Leu Pro Asp Ala
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 <213> *Thermus thermophilus*

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cag tgg cgg gag gtg atg gcg gcc ttg gag gtg ggg ccg gag gcc gcc		96
Gln Trp Arg Glu Val Met Ala Ala Leu Glu Val Gly Pro Glu Ala Ala		
20 25 30		
ctg gcc tac tgg cac cgg ggc ttt agg cgc aag gag gac ctg gac ccc		144
Leu Ala Tyr Trp His Arg Gly Phe Arg Arg Lys Glu Asp Leu Asp Pro		
35 40 45		
ccc ctc gcc ctc ctt ccc ctc aag ggc ctg agg gag gcg gcg gcc ctc		192
Pro Leu Ala Leu Leu Pro Leu Lys Gly Leu Arg Glu Ala Ala Ala Leu		
50 55 60		
ctg gag gag gcg ctc cgc cag ggg aag cgg atc cgc gtc cac ggg gac		240
Leu Glu Glu Ala Leu Arg Gln Gly Lys Arg Ile Arg Val His Gly Asp		
65 70 75 80		
tac gac gcc gac ggg ctc acg ggc acg gcc atc ctg gtt cgg ggc ctc		288
Tyr Asp Ala Asp Gly Leu Thr Gly Thr Ala Ile Leu Val Arg Gly Leu		
85 90 95		
gcc gcc ttg ggc gcc gac gtc cac ccc ttc atc ccc cac cgg ctg gag		336
Ala Ala Leu Gly Ala Asp Val His Pro Phe Ile Pro His Arg Leu Glu		
100 105 110		
gaa ggg tac ggg gtg ctg atg gag cgg gtt ccc gag cac ctc gag gcc		384
Glu Gly Tyr Gly Val Leu Met Glu Arg Val Pro Glu His Leu Glu Ala		
115 120 125		
tcg gac ctc ttc ctc acc gtg gac tgc ggg atc acg aac cac gcc gag		432
Ser Asp Leu Phe Leu Thr Val Asp Cys Gly Ile Thr Asn His Ala Glu		

11283-013001.ST25.txt

130	135	140	
ctc agg gag ctt ttg gaa aac ggg gtg gag gtg atc gtc acc gac cac			480
Leu Arg Glu Leu Leu Glu Asn Gly Val Glu Val Ile Val Thr Asp His			
145	150	155	160
cac acc ccc ggc aag acc cct tcc ccc ggc ctc gtg gtc cac ccc gcc			528
His Thr Pro Gly Lys Thr Pro Ser Pro Gly Leu Val Val His Pro Ala			
165	170	175	
ctc acc ccg gac ctt aag gag aag ccc acg ggg gcg ggg gtg gtc ttc			576
Leu Thr Pro Asp Leu Lys Glu Lys Pro Thr Gly Ala Gly Val Val Phe			
180	185	190	
ctc ctc ctc tgg gcc ctc cac gag cgc ctg ggc ctt ccc cca ccc ctg			624
Leu Leu Leu Trp Ala Leu His Glu Arg Leu Gly Leu Pro Pro Pro Leu			
195	200	205	
gag tac gcc gac ctc gcc gcg gtg ggc acc atc gcc gac gtg gcc ccc			672
Glu Tyr Ala Asp Leu Ala Ala Val Gly Thr Ile Ala Asp Val Ala Pro			
210	215	220	
ctt tgg ggc tgg aac cgg gcc ttg gtg aag gag ggc ctg gcc cgc atc			720
Leu Trp Gly Trp Asn Arg Ala Leu Val Lys Glu Gly Leu Ala Arg Ile			
225	230	235	240
ccc gcc tcc tcc tgg gtt ggg ctc agg ctt ctg gcc gag gcg gtg ggg			768
Pro Ala Ser Ser Trp Val Gly Leu Arg Leu Leu Ala Glu Ala Val Gly			
245	250	255	
tac acg ggg aag gcg gtg gag gtg gcc ttc cgc atc gcc ccc cgg atc			816
Tyr Thr Gly Lys Ala Val Glu Val Ala Phe Arg Ile Ala Pro Arg Ile			
260	265	270	
aac gcg gca agc cgc ctc ggg gag gct gag aag gcc cta agg ctc ctc			864
Asn Ala Ala Ser Arg Leu Gly Glu Ala Glu Lys Ala Leu Arg Leu Leu			
275	280	285	
ctc acc gac gac gcg gcc gag gcc cag gcc ctc gtg ggg gaa ctc cac			912
Leu Thr Asp Asp Ala Ala Glu Ala Gln Ala Leu Val Gly Glu Leu His			
290	295	300	
cg ^g ctg aac gcc cgc cgc cag acc ctg gag gag gcc atg ctc agg aag			960
Arg Leu Asn Ala Arg Arg Gln Thr Leu Glu Glu Ala Met Leu Arg Lys			
305	310	315	320
ctc ctc ccc cag gcg gac ccc gag gcc aag gcc atc gtc ctc ctg gac			1008
Leu Leu Pro Gln Ala Asp Pro Glu Ala Lys Ala Ile Val Leu Leu Asp			
325	330	335	
ccc gag ggg cac ccg ggg gtg atg ggc atc gtg gcg agc cgc atc ctg			1056
Pro Glu Gly His Pro Gly Val Met Gly Ile Val Ala Ser Arg Ile Leu			
340	345	350	
gag gcc acc ctc cgg ccc gtc ttc ctg gtg gcc cag ggc aag ggg acg			1104
Glu Ala Thr Leu Arg Pro Val Phe Leu Val Ala Gln Gly Lys Gly Thr			
355	360	365	
gtg cgg agc ctc gcc ccc atc acg gcc gtg gag gcc cta agg agc gcc			1152
Val Arg Ser Leu Ala Pro Ile Ser Ala Val Glu Ala Leu Arg Ser Ala			
370	375	380	
gag gac ctt ttg ttg cgc tac ggg ggg cac aag gag gcg gcg ggc ttc			1200

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Glu	Asp	Leu	Leu	Leu	Arg	Tyr	Gly	Gly	His	Lys	Glu	Ala	Ala	Gly	Phe		
385					390				395						400		
gcc	atg	gac	gag	gcc	ctc	ttc	ccc	gcc	ttc	aag	gcc	cg	gtg	gag	gcc	1248	
Ala	Met	Asp	Glu	Ala	Leu	Phe	Pro	Ala	Phe	Lys	Ala	Arg	Val	Glu	Ala		
									410					415			
tac	gcc	gcc	cgc	ttc	ccc	gac	ccc	gtg	cgc	gag	gtg	gcc	ctt	ttg	gac	1296	
Tyr	Ala	Ala	Arg	Phe	Pro	Asp	Pro	Val	Arg	Glu	Val	Ala	Leu	Leu	Asp		
								425					430				
ctg	ctt	ccg	gag	ccc	ggc	ctc	ctc	ccc	cag	gtc	ttc	cg	gag	ctc	gcc	1344	
Leu	Leu	Pro	Glu	Pro	Gly	Leu	Leu	Pro	Gln	Val	Phe	Arg	Glu	Leu	Ala		
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ctt	ttg	gag	ccc	tac	ggc	gag	gga	aac	ccc	gag	ccc	ctc	ttc	ctc	ctc	1392	
Leu	Leu	Glu	Pro	Tyr	Gly	Glu	Gly	Asn	Pro	Glu	Pro	Leu	Phe	Leu	Leu		
								455				460					
ttc	ggc	gcc	ccg	gag	gag	gcc	cg	cgc	ctc	gg	gag	ggc	cgc	cac	ctc	1440	
Phe	Gly	Ala	Pro	Glu	Glu	Ala	Arg	Arg	Leu	Gly	Glu	Gly	Arg	His	Leu		
								470				475					
gcc	ttc	cgc	ctg	aag	ggg	gtg	cg	gtc	ctg	gcc	tgg	aaa	cag	ggg	gac	1488	
Ala	Phe	Arg	Leu	Lys	Gly	Val	Arg	Val	Leu	Ala	Trp	Lys	Gln	Gly	Asp		
								485				490					
ctc	gcc	ctg	ccc	ccg	gag	gtg	gag	gtg	gag	ggc	ctc	ctc	agc	gaa	aac	1536	
Leu	Ala	Leu	Pro	Pro	Glu	Val	Glu	Val	Ala	Gly	Leu	Leu	Ser	Glu	Asn		
								500				505					
510													510				
gcc	tgg	aac	ggc	cac	ctc	gcc	tac	gag	gtc	cag	g	gtg	gac	ctg	cga	1584	
Ala	Trp	Asn	Gly	His	Leu	Ala	Tyr	Glu	Val	Gln	Ala	Val	Asp	Leu	Arg		
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525																	
aag	cca	gag	g	ctg	gag	ggc	gg	atc	g	cg	ccc	ttc	gcc	tac	ccc	ctg	1632
Lys	Pro	Glu	Ala	Leu	Glu	Gly	Gly	Ile	Ala	Pro	Phe	Ala	Tyr	Pro	Leu		
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ccc	ctc	ctc	gag	gcc	ctg	gcc	cg	ggc	ctg	gg	gaa	gg	gtc	tac		1680	
Pro	Leu	Leu	Glu	Ala	Leu	Ala	Arg	Ala	Arg	Leu	Gly	Gly	Val	Tyr			
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												555					
560																	
gtc	ccc	gag	gac	aac	cct	gag	gg	ctg	gac	tac	gcc	agg	aag	g	gc	1728	
Val	Pro	Glu	Asp	Asn	Pro	Glu	Gly	Leu	Asp	Tyr	Ala	Arg	Lys	Ala	Gly		
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ttc	cgc	ctc	ctc	ccc	ccc	gag	gag	gcc	gg	ctt	tgg	ctc	gg	ctc	ccc	1776	
Phe	Arg	Leu	Leu	Pro	Pro	Glu	Glu	Ala	Gly	Leu	Trp	Leu	Gly	Leu	Pro		
								580				585					
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cca	agg	ccg	gtc	ctg	ggc	agg	cg	gt	gag	gt	gcc	ctg	gg	cg	gag	1824	
Pro	Arg	Pro	Val	Leu	Gly	Arg	Arg	Val	Glu	Val	Ala	Leu	Gly	Arg	Glu		
								595				600					
												605					
610																	
g	cg	cg	gg	cc	tt	tc	cc	cc	gt	ctc	cac	acc	ccc	gag	gc	1872	
Ala	Arg	Ala	Arg	Leu	Ser	Ala	Pro	Pro	Val	Leu	His	Thr	Pro	Glu	Ala		
												615					
												620					
625																	
cg	ctc	aaa	gcc	ctc	gtc	cac	cg	cgc	ctc	ctc	ttc	gcc	tac	gag	cgc	1920	
Arg	Leu	Lys	Ala	Leu	Val	His	Arg	Arg	Leu	Leu	Phe	Ala	Tyr	Glu	Arg		
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cgt cac ccg ggc ctc ttc agc gag gcc ctc ctc gcc tac tgg gag gtg	1968
Arg His Pro Gly Leu Phe Ser Glu Ala Leu Leu Ala Tyr Trp Glu Val	
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aac cgt gta cag gag ccc gcg gga agc cca	1998
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<210> 4
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<213> Thermus thermophilus

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Gln Trp Arg Glu Val Met Ala Ala Leu Glu Val Gly Pro Glu Ala Ala	
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Leu Ala Tyr Trp His Arg Gly Phe Arg Arg Lys Glu Asp Leu Asp Pro	
35 40 45	

Pro Leu Ala Leu Leu Pro Leu Lys Gly Leu Arg Glu Ala Ala Ala Leu	
50 55 60	

Leu Glu Glu Ala Leu Arg Gln Gly Lys Arg Ile Arg Val His Gly Asp	
65 70 75 80	

Tyr Asp Ala Asp Gly Leu Thr Gly Thr Ala Ile Leu Val Arg Gly Leu	
85 90 95	

Ala Ala Leu Gly Ala Asp Val His Pro Phe Ile Pro His Arg Leu Glu	
100 105 110	

Glu Gly Tyr Gly Val Leu Met Glu Arg Val Pro Glu His Leu Glu Ala	
115 120 125	

Ser Asp Leu Phe Leu Thr Val Asp Cys Gly Ile Thr Asn His Ala Glu	
130 135 140	

Leu Arg Glu Leu Leu Glu Asn Gly Val Glu Val Ile Val Thr Asp His	
145 150 155 160	

His Thr Pro Gly Lys Thr Pro Ser Pro Gly Leu Val Val His Pro Ala	
165 170 175	

Leu Thr Pro Asp Leu Lys Glu Lys Pro Thr Gly Ala Gly Val Val Phe	
180 185 190	

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Leu Leu Leu Trp Ala Leu His Glu Arg Leu Gly Leu Pro Pro Pro Leu
195 200 205

Glu Tyr Ala Asp Leu Ala Ala Val Gly Thr Ile Ala Asp Val Ala Pro
210 215 220

Leu Trp Gly Trp Asn Arg Ala Leu Val Lys Glu Gly Leu Ala Arg Ile
225 230 235 240

Pro Ala Ser Ser Trp Val Gly Leu Arg Leu Leu Ala Glu Ala Val Gly
245 250 255

Tyr Thr Gly Lys Ala Val Glu Val Ala Phe Arg Ile Ala Pro Arg Ile
260 265 270

Asn Ala Ala Ser Arg Leu Gly Glu Ala Glu Lys Ala Leu Arg Leu Leu
275 280 285

Leu Thr Asp Asp Ala Ala Glu Ala Gln Ala Leu Val Gly Glu Leu His
290 295 300

Arg Leu Asn Ala Arg Arg Gln Thr Leu Glu Glu Ala Met Leu Arg Lys
305 310 315 320

Leu Leu Pro Gln Ala Asp Pro Glu Ala Lys Ala Ile Val Leu Leu Asp
325 330 335

Pro Glu Gly His Pro Gly Val Met Gly Ile Val Ala Ser Arg Ile Leu
340 345 350

Glu Ala Thr Leu Arg Pro Val Phe Leu Val Ala Gln Gly Lys Gly Thr
355 360 365

Val Arg Ser Leu Ala Pro Ile Ser Ala Val Glu Ala Leu Arg Ser Ala
370 375 380

Glu Asp Leu Leu Leu Arg Tyr Gly Gly His Lys Glu Ala Ala Gly Phe
385 390 395 400

Ala Met Asp Glu Ala Leu Phe Pro Ala Phe Lys Ala Arg Val Glu Ala
405 410 415

Tyr Ala Ala Arg Phe Pro Asp Pro Val Arg Glu Val Ala Leu Leu Asp
420 425 430

Leu Leu Pro Glu Pro Gly Leu Leu Pro Gln Val Phe Arg Glu Leu Ala
435 440 445

11283-013001.ST25.txt

Leu Leu Glu Pro Tyr Gly Glu Gly Asn Pro Glu Pro Leu Phe Leu Leu
450 455 460

Phe Gly Ala Pro Glu Glu Ala Arg Arg Leu Gly Glu Gly Arg His Leu
465 470 475 480

Ala Phe Arg Leu Lys Gly Val Arg Val Leu Ala Trp Lys Gln Gly Asp
485 490 495

Leu Ala Leu Pro Pro Glu Val Glu Val Ala Gly Leu Leu Ser Glu Asn
500 505 510

Ala Trp Asn Gly His Leu Ala Tyr Glu Val Gln Ala Val Asp Leu Arg
515 520 525

Lys Pro Glu Ala Leu Glu Gly Gly Ile Ala Pro Phe Ala Tyr Pro Leu
530 535 540

Pro Leu Leu Glu Ala Leu Ala Arg Ala Arg Leu Gly Glu Gly Val Tyr
545 550 555 560

Val Pro Glu Asp Asn Pro Glu Gly Leu Asp Tyr Ala Arg Lys Ala Gly
565 570 575

Phe Arg Leu Leu Pro Pro Glu Glu Ala Gly Leu Trp Leu Gly Leu Pro
580 585 590

Pro Arg Pro Val Leu Gly Arg Arg Val Glu Val Ala Leu Gly Arg Glu
595 600 605

Ala Arg Ala Arg Leu Ser Ala Pro Pro Val Leu His Thr Pro Glu Ala
610 615 620

Arg Leu Lys Ala Leu Val His Arg Arg Leu Leu Phe Ala Tyr Glu Arg
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Asn Arg Val Gln Glu Pro Ala Gly Ser Pro
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<210> 5
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<213> Thermus thermophilus

11283-013001.ST25.txt

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225					230				235						240	
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Gly	Pro	His	Arg	Asp	Asp	Leu	Val	Phe	Leu	Leu	Glu	Gly	Arg	Pro	Ala	
						245			250				255			
cac	cg	ttc	gcc	agc	cgc	ggg	gag	gcc	aag	acc	ctg	gcc	ctg	gcc	ctg	816
His	Arg	Phe	Ala	Ser	Arg	Gly	Glu	Ala	Lys	Thr	Leu	Ala	Leu	Ala	Leu	
						260		265			270					
cgc	ctc	gcc	gag	cac	cgc	ctc	ctc	g	gc	gag	cac	cac	g	cc	ccc	864
Arg	Leu	Ala	Glu	His	Arg	Leu	Leu	Gly	Glu	His	His	Gly	Glu	Pro	Pro	
						275		280			285					
ctc	ctc	ctc	gtg	gac	gag	tgg	ggg	gag	gag	ctg	gac	gag	gcc	cgc	agg	912
Leu	Leu	Leu	Val	Asp	Glu	Trp	Gly	Glu	Glu	Leu	Asp	Glu	Ala	Arg	Arg	
						290		295			300					
cg	gc	gtc	ctc	gc	tc	ac	gc	ca	gc	ctg	cc	ca	gc	atc	ctg	960
Arg	Ala	Val	Leu	Ala	Tyr	Ala	Gln	Ala	Leu	Pro	Gln	Ala	Ile	Leu	Ala	
						305		310			315			320		
gg	ct	gaa	gc	cc	cc	gg	gt	cc	gt	ta	tg	tg	gt	ca	gg	1008
Gly	Leu	Glu	Ala	Pro	Pro	Gly	Val	Pro	Val	Cys	Ser	Val	Val	Arg	Gly	
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gt	gt	ct	tg	ct	cc	gg	gc	gc	gc	gc	tg	tg	gt	ca	gg	1029
Val	Val	Leu	Cys	Pro	Gly	Ala										
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 <213> *Thermus thermophilus*

<400> 6

Met Arg Leu Leu Leu Phe Arg Gln Arg Asn Phe Arg Asn Leu Ala Leu
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Ala Gln Gly Lys Thr Ser Leu Leu Leu Gly Ile His Leu Ala Leu Gly
 35 40 45

Gly Glu Val Pro Leu Gly Leu Ala Asp Leu Val Arg Phe Gly Glu Glu
 50 55 60

Glu Ala Trp Leu His Ala Glu Val Glu Thr Glu Leu Gly Ala Tyr Arg
 65 70 75 80

Leu Glu His Arg Leu Gly Pro Gly Gly Arg Glu Val Leu Leu Asn Gly
 85 90 95

11283-013001.ST25.txt

Lys Arg Val Ser Leu Arg Thr Leu Trp Glu Leu Pro Gly Ser Val Leu
100 105 110

Val Ser Pro Leu Asp Leu Glu Ala Val Leu Gly Pro Lys Glu Glu Arg
115 120 125

Arg Ala Tyr Leu Asp Arg Leu Ile Ala Arg Phe Ser Arg Arg Tyr Ala
130 135 140

Ala Leu Leu Ser Ala Tyr Glu Lys Ala Leu Arg Gln Arg Asn Ala Leu
145 150 155 160

Leu Lys Ala Gly Gly Glu Gly Leu Ser Ala Trp Asp Arg Glu Leu Ala
165 170 175

Arg Tyr Gly Asp Glu Ile Val Ala Leu Arg Arg Arg Phe Leu Arg Arg
180 185 190

Phe Ala Pro Ile Leu Arg Glu Val His Ala Ala Leu Ala Ala Lys Glu
195 200 205

Ala Gly Leu Arg Leu Glu Glu Thr Ala Gly Glu Gly Val Leu Arg Ala
210 215 220

Leu Glu Ala Ser Arg Ala Glu Glu Arg Glu Arg Gly Gln Thr Leu Val
225 230 235 240

Gly Pro His Arg Asp Asp Leu Val Phe Leu Leu Glu Gly Arg Pro Ala
245 250 255

His Arg Phe Ala Ser Arg Gly Glu Ala Lys Thr Leu Ala Leu Ala Leu
260 265 270

Arg Leu Ala Glu His Arg Leu Leu Gly Glu His His Gly Glu Pro Pro
275 280 285

Leu Leu Leu Val Asp Glu Trp Gly Glu Glu Leu Asp Glu Ala Arg Arg
290 295 300

Arg Ala Val Leu Ala Tyr Ala Gln Ala Leu Pro Gln Ala Ile Leu Ala
305 310 315 320

Gly Leu Glu Ala Pro Pro Gly Val Pro Val Cys Ser Val Val Arg Gly
325 330 335

Val Val Leu Cys Pro Gly Ala
340

11283-013001.ST25.txt

<210> 7
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<213> *Thermus thermophilus*

<220>
<221> CDS
<222> (1)..(2934)

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cag gtg ggg gcg gcc ttg ctt ttc gcc cag gag gcc ccc ccc ccg gcc ctc		96
Gln Val Gly Ala Ala Leu Leu Phe Ala Gln Glu Ala Pro Pro Ala Leu		
20 25 30		
ctc ctc gtc ccc gag gcg cgg ctt agg cgc tac cgg gac ctc tcc gcc		144
Leu Leu Val Pro Glu Ala Arg Leu Arg Arg Tyr Arg Asp Leu Ser Ala		
35 40 45		
ttc ggg gcc aag gtc tac gtg aac ccc ggc ctc gag gcc ctg gag gaa		192
Phe Gly Ala Lys Val Tyr Val Asn Pro Gly Leu Glu Ala Leu Glu Glu		
50 55 60		
aaa gcc ctc ttc gtc ctc tcc tac gag gag gcc cta agc ccc ttc ccc		240
Lys Ala Leu Phe Val Leu Ser Tyr Glu Glu Ala Leu Ser Pro Phe Pro		
65 70 75 80		
gag gac cct gag gcc tgg cgg ctt ctt ctg gag gtg ggc cgc gcc tac		288
Glu Asp Pro Glu Ala Trp Arg Leu Leu Leu Glu Val Gly Arg Ala Tyr		
85 90 95		
ccc cgg gag gcc ctc ctc tcc cgc ctc ctc aag ctg ggc tac gcc cgg		336
Pro Arg Glu Ala Leu Leu Ser Arg Leu Leu Lys Leu Gly Tyr Ala Arg		
100 105 110		
gac gag gac tac cgc gtc ctg ggg gag gtg gtg gag ctc ggc gag gtg		384
Asp Glu Asp Tyr Arg Val Leu Gly Glu Val Val Glu Leu Gly Glu Val		
115 120 125		
cgc ctg gag ttc ttc ggg gac gag ctg gaa agg ctt gtg gtc cgg ggg		432
Arg Leu Glu Phe Phe Gly Asp Glu Leu Glu Arg Leu Val Val Arg Gly		
130 135 140		
gag gaa agg cgg cgc cac gtc ctt ctg ccc aag ccg ggg aag gcg gag		480
Glu Glu Arg Arg Arg His Val Leu Leu Pro Lys Pro Gly Lys Ala Glu		
145 150 155 160		
ggc ttc acc tcc aag aag gtc ctc cac ttc cct ggc ccc gtc tac ctg		528
Gly Phe Thr Ser Lys Lys Val Leu His Phe Pro Gly Pro Val Tyr Leu		
165 170 175		
gac acc ccc gcc ctc gcc ccc aag gcc ctt tgg ccc ctc ctc gcg gga		576
Asp Thr Pro Ala Leu Ala Pro Lys Ala Leu Trp Pro Leu Leu Ala Gly		
180 185 190		
agg ccc tgg gtg gcc ctg ggc ggc ggg gtg gag ctc ccc ccc ttg gag		624
Arg Pro Trp Val Ala Leu Gly Gly Gly Val Glu Leu Pro Pro Leu Glu		
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Leu	Gly	Ala	Arg	Pro	Leu	Pro	Pro	Tyr	Arg	Gly	Ser	Leu	Lys	Ala	Leu			
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gaa	aag	gac	ctc	gcc	cgc	tgg	ctt	gcc	gag	ggg	aag	cgf	gtc	cac	ctc		720	
Glu	Lys	Asp	Leu	Ala	Arg	Trp	Leu	Ala	Glu	Gly	Lys	Arg	Val	His	Leu			
225		230									235					240		
ttc	gtg	ggc	cac	gcc	cgc	acc	ttg	gag	tac	ctc	aaa	agg	cgf	ctc	cag		768	
Phe	Val	Gly	His	Ala	Arg	Thr	Leu	Glu	Tyr	Leu	Lys	Arg	Arg	Leu	Gln			
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gcc	ttc	tcg	ccc	ctc	atc	ctg	gac	cgc	ttc	ccc	ggc	ccc	aag	ggg	cgg		816	
Ala	Phe	Ser	Pro	Leu	Ile	Leu	Asp	Arg	Phe	Pro	Gly	Pro	Lys	Gly	Arg			
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ctt	gcc	ctc	ctc	ccc	ggg	gac	ttt	gag	ggc	ggg	gcf	gag	tgg	gga	gag		864	
Leu	Ala	Leu	Leu	Pro	Gly	Asp	Phe	Glu	Gly	Gly	Ala	Glu	Trp	Gly	Glu			
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tgg	gtc	ctc	ctc	acc	gag	gcc	ctg	gtc	ttc	gcc	acc	ggg	ggg	gtg	cgg		912	
Trp	Val	Leu	Leu	Thr	Glu	Ala	Leu	Val	Phe	Ala	Thr	Gly	Gly	Val	Arg			
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gcc	agg	gtc	cgf	gta	ggg	gag	ggg	ctc	agc	gac	ccc	ggg	gcc	ctt	tcc		960	
Ala	Arg	Val	Arg	Val	Gly	Glu	Gly	Leu	Ser	Asp	Pro	Gly	Ala	Leu	Ser			
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cca	ggg	gac	tac	ctc	atc	cac	ccg	gag	cac	ggc	gtc	ggg	cag	tac	ctg		1008	
Pro	Gly	Asp	Tyr	Leu	Ile	His	Pro	Glu	His	Gly	Val	Gly	Gln	Tyr	Leu			
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ggc	ctc	gag	acc	cgf	ggg	gag	gtc	ctg	ggg	gtc	aag	cgf	gac	tac	ctg	gtc		1056
Gly	Leu	Glu	Thr	Arg	Glu	Val	Leu	Gly	Val	Lys	Arg	Asp	Tyr	Leu	Val			
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ctg	cgc	tac	aag	ggg	gaa	ggg	aag	ctc	tac	ctc	ccc	gtg	gag	cag	ctt		1104	
Leu	Arg	Tyr	Lys	Gly	Glu	Gly	Lys	Leu	Tyr	Leu	Pro	Val	Glu	Gln	Leu			
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ccc	ctc	ctc	aag	cgc	cac	ccc	ggg	acc	acc	gac	gac	ccc	ccg	gag	ctt		1152	
Pro	Leu	Leu	Lys	Arg	His	Pro	Gly	Thr	Thr	Asp	Asp	Pro	Pro	Glu	Leu			
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tcc	tcc	ctg	ggc	aag	aac	gag	tgg	caa	agg	gcc	aag	gag	cgf	gcf	cgg		1200	
Ser	Ser	Leu	Gly	Lys	Asn	Glu	Trp	Gln	Arg	Ala	Lys	Glu	Arg	Ala	Arg			
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aag	gac	gtg	gag	gag	ctg	gct	ggg	cgc	ctc	ctc	gtc	ctc	cag	gcc	aag		1248	
Lys	Asp	Val	Glu	Glu	Leu	Ala	Gly	Arg	Leu	Leu	Val	Leu	Gln	Ala	Lys			
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cgc	aag	gcc	acc	ccg	ggc	cgg	gcc	ttt	ccc	cct	ttg	ccc	gag	tgg	gat		1296	
Arg	Lys	Ala	Thr	Pro	Gly	Arg	Ala	Phe	Pro	Pro	Leu	Pro	Glu	Trp	Asp			
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Pro	Leu	Val	Glu	Lys	Gly	Phe	Pro	Tyr	Glu	Leu	Thr	Pro	Asp	Gln	Lys			
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cgg	gcc	ctg	gag	gag	gtc	ctc	cgc	gac	ctg	gaa	agc	ccc	cac	ccc	atg		1392	
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Leu	Arg	Ala	Ala	His	Arg	Val	Val	Gly	His	Gly	Ala	Gln	Val	Ala	Phe		
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ctg	ggg	cca	acc	acc	ctc	ctc	gcc	gag	cag	cac	ggg	aag	acc	ttt	agg	1536	
Leu	Gly	Pro	Thr	Thr	Leu	Leu	Ala	Glu	Gln	His	Gly	Lys	Thr	Phe	Arg		
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gag	cgc	ttc	cag	ggg	ctt	ccc	gtg	agg	gtt	g	gc	gtc	ctc	tcc	cgc	ttc	1584
Glu	Arg	Phe	Gln	Gly	Leu	Pro	Val	Arg	Val	Ala	Val	Leu	Ser	Arg	Phe		
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acc	ccg	ccc	aag	gag	gag	gag	gcc	atc	cta	aaa	g	gc	ctc	gcc	gag	ggg	1632
Thr	Pro	Pro	Lys	Glu	Glu	Glu	Ala	Ile	Leu	Lys	Gly	Leu	Ala	Glu	Gly		
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acg	gtg	gac	atc	gtc	atc	ggc	acc	cac	cgc	ctc	ctc	cag	gag	gac	gtg	1680	
Thr	Val	Asp	Ile	Val	Ile	Gly	Thr	His	Arg	Leu	Leu	Gln	Glu	Asp	Val		
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cgc	ttc	agg	gac	ctc	ggc	ctc	ctc	atc	gtg	gac	gag	gag	cac	cgc	ttc	1728	
Arg	Phe	Arg	Asp	Leu	Gly	Leu	Leu	Ile	Val	Asp	Glu	Glu	His	Arg	Phe		
					565			570							575		
ggc	gtg	gcc	caa	aag	gag	agg	atc	cg	gag	ctc	aag	g	gc	gag	gtg	gac	1776
Gly	Val	Ala	Gln	Lys	Glu	Arg	Ile	Arg	Glu	Leu	Lys	Ala	Glu	Val	Asp		
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Thr	Leu	Tyr	Leu	Ser	Ala	Thr	Pro	Ile	Pro	Arg	Thr	Leu	Tyr	Ser	Ala		
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ctg	gtg	ggc	ctc	aaa	gac	ctt	tcc	agc	atc	cag	acc	ccg	ccc	ccg	ggg	1872	
Leu	Val	Gly	Leu	Lys	Asp	Leu	Ser	Ser	Ile	Gln	Thr	Pro	Pro	Pro	Gly		
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cgc	aag	ccc	atc	aag	acc	ttc	ctc	gct	ccc	ttt	gat	ccc	ctc	ttg	gtg	1920	
Arg	Lys	Pro	Ile	Lys	Thr	Phe	Leu	Ala	Pro	Phe	Asp	Pro	Leu	Leu	Val		
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cgg	gag	gcc	atc	ctc	ttt	gag	ctg	gag	cgt	ggg	ggc	aag	gtc	ttc	tac	1968	
Arg	Glu	Ala	Ile	Leu	Phe	Glu	Leu	Glu	Arg	Gly	Gly	Lys	Val	Phe	Tyr		
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gtc	cac	gac	cg	gt	gg	cc	tcc	ata	gag	ggc	agg	cgg	cgc	ttt	ctg	gaa	2016
Val	His	Asp	Arg	Val	Ala	Ser	Ile	Glu	Ala	Arg	Arg	Arg	Arg	Phe	Leu	Glu	
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aac	ctc	gtc	ccc	gag	ggc	cgc	atc	ggg	gt	gtc	cac	ggc	cag	atg	ccc	2064	
Asn	Leu	Val	Pro	Glu	Ala	Arg	Ile	Gly	Val	Val	His	Gly	Gln	Met	Pro		
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gaa	agc	ctc	att	gag	gag	acc	atg	ctc	ctc	ttc	ggc	gaa	ggg	g	cg	ta	2112
Glu	Ser	Leu	Ile	Glu	Glu	Thr	Met	Leu	Leu	Phe	Ala	Glu	Gly	Ala	Tyr		
					690			695							700		
gac	gtc	ctc	ctc	gcc	acc	acc	atc	att	gag	g	gc	ggc	ctg	gac	gtg	ccc	2160

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Asp	Val	Leu	Leu	Ala	Thr	Thr	Ile	Ile	Glu	Ala	Gly	Leu	Asp	Val	Pro		
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gag	gcg	aac	acc	atc	ctc	att	gag	cg	g	g	ac	cg	ct	gg	ct	gg	2208
Glu	Ala	Asn	Thr	Ile	Leu	Ile	Glu	Arg	Ala	Asp	Arg	Leu	Gly	Leu	Ala		
					725			730					735				
acc	ttg	tac	cag	ctc	cg	gg	cg	gt	gg	cg	gg	ag	gag	gag	gag	gg	2256
Thr	Leu	Tyr	Gln	Leu	Arg	Gly	Arg	Val	Gly	Arg	Arg	Glu	Glu	Glu	Glu	Ala	
					740			745				750					
tac	gcc	tac	ctc	ttc	ca	cc	cg	cc	ct	ac	gag	gg	cc	gg	gag	aa	2304
Tyr	Ala	Tyr	Leu	Phe	His	Pro	Pro	Arg	Leu	Thr	Glu	Ala	Ala	Glu	Lys		
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cgc	ctc	gcc	gg	atc	gg	ac	ctc	tcc	gat	ct	gg	tc	gg	cc	ca	ct	2352
Arg	Leu	Ala	Ala	Ile	Ala	Asp	Leu	Ser	Asp	Leu	Gly	Ser	Gly	His	Leu		
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ctg	gg	gaa	agg	gac	atg	gaa	atc	cg	gg	gc	gt	gg	aa	ctt	tt	gg	2400
Leu	Ala	Glu	Arg	Asp	Met	Glu	Ile	Arg	Gly	Val	Gly	Asn	Leu	Leu	Gly		
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ccg	gag	cag	ca	gg	ca	atc	cg	gg	ctt	tcc	ctc	gag	gt	tc	ta	cc	2448
Pro	Glu	Gln	His	Gly	His	Ile	Arg	Ala	Leu	Ser	Leu	Glu	Val	Tyr	Thr		
					805			810					815				
gag	ctt	ctg	gaa	gag	gg	atc	cg	aa	ctc	aa	gg	gg	gg	cc	aa	gg	2496
Glu	Leu	Leu	Glu	Glu	Ala	Ile	Arg	Lys	Leu	Lys	Gly	Glu	Ala	Lys	Glu		
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gag	cg	cg	ca	gt	ac	ctg	gac	ctc	gg	cc	ct	cc	gg	ct	cc	cc	2544
Glu	Arg	Arg	His	Val	Thr	Leu	Asp	Leu	Ala	Leu	Ser	Ala	Arg	Leu	Pro		
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g	cg	g	tg	gg	ag	ctc	g	gg	cc	2592							
Ala	Glu	Tyr	Val	Gly	Ser	Leu	Glu	Ala	Arg	Ser	Arg	Tyr	Tyr	Ser	Arg		
					850			855			860						
ttt	gg	gag	gg	aaa	ag	ctc	gg	gag	ctt	tcc	cc	ct	gt	gg	gg	gg	2640
Phe	Ala	Glu	Ala	Lys	Ser	Leu	Ala	Glu	Leu	Ser	Arg	Leu	Val	Arg	Glu		
					865			870			875			880			
ctc	aaa	gag	cg	ta	gg	cc	tt	cc	gag	gag	gg	gg	gg	tt	gt	gg	2688
Leu	Lys	Glu	Arg	Tyr	Gly	Pro	Leu	Pro	Glu	Glu	Ala	Glu	Asn	Phe	Val		
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gg	cc	cc	gg	ctc	cg	ctg	gt	gg	gag	gg	gg	gg	gt	gt	tcc	tt	2736
Ala	Leu	Ala	Arg	Leu	Arg	Leu	Val	Ala	Glu	Arg	Lys	Gly	Val	Val	Ser		
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atc	acg	gag	gg	ctc	ac	ca	ctg	gag	gt	gt	gt	cc	cc	cc	cc	cc	2784
Ile	Thr	Glu	Gly	Leu	Thr	His	Leu	Glu	Val	Val	Phe	Pro	Arg	Tyr	Pro		
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ctg	gac	ta	gac	gg	cg	gg	ctc	aa	gg	ctt	cc	ta	cg	gt	gg	2832	
Leu	Asp	Tyr	Asp	Ala	Arg	Gly	Leu	Lys	Gly	Leu	Pro	Tyr	Arg	Val	Glu		
					930			935			940						
ctt	acg	cag	ta	cc	cc	gg	tt	cc	cg	ct	gag	aa	aa	gg	ct	gg	2880
Leu	Thr	Gln	Tyr	Pro	Pro	Gly	Phe	Arg	Leu	Glu	Lys	Lys	Gly	Leu	Arg		
					945			950			955			960			

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ccc cg gac tac ccc gag gcc ctg atg gag gtg ctc tac ctc ttc gcc 2928
 Pro Arg Asp Tyr Pro Glu Ala Leu Met Glu Val Leu Tyr Leu Phe Ala
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gac ctc 2934
 Asp Leu

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Gln Val Gly Ala Ala Leu Leu Phe Ala Gln Glu Ala Pro Pro Ala Leu
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 35 40 45

Phe Gly Ala Lys Val Tyr Val Asn Pro Gly Leu Glu Ala Leu Glu Glu
 50 55 60

Lys Ala Leu Phe Val Leu Ser Tyr Glu Glu Ala Leu Ser Pro Phe Pro
 65 70 75 80

Glu Asp Pro Glu Ala Trp Arg Leu Leu Leu Glu Val Gly Arg Ala Tyr
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Pro Arg Glu Ala Leu Leu Ser Arg Leu Leu Lys Leu Gly Tyr Ala Arg
 100 105 110

Asp Glu Asp Tyr Arg Val Leu Gly Glu Val Val Glu Leu Gly Glu Val
 115 120 125

Arg Leu Glu Phe Phe Gly Asp Glu Leu Glu Arg Leu Val Val Arg Gly
 130 135 140

Glu Glu Arg Arg Arg His Val Leu Leu Pro Lys Pro Gly Lys Ala Glu
 145 150 155 160

Gly Phe Thr Ser Lys Lys Val Leu His Phe Pro Gly Pro Val Tyr Leu
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Asp Thr Pro Ala Leu Ala Pro Lys Ala Leu Trp Pro Leu Leu Ala Gly
 180 185 190

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Arg Pro Trp Val Ala Leu Gly Gly Gly Val Glu Leu Pro Pro Leu Glu
195 200 205

Leu Gly Ala Arg Pro Leu Pro Pro Tyr Arg Gly Ser Leu Lys Ala Leu
210 215 220

Glu Lys Asp Leu Ala Arg Trp Leu Ala Glu Gly Lys Arg Val His Leu
225 230 235 240

Phe Val Gly His Ala Arg Thr Leu Glu Tyr Leu Lys Arg Arg Leu Gln
245 250 255

Ala Phe Ser Pro Leu Ile Leu Asp Arg Phe Pro Gly Pro Lys Gly Arg
260 265 270

Leu Ala Leu Leu Pro Gly Asp Phe Glu Gly Gly Ala Glu Trp Gly Glu
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Trp Val Leu Leu Thr Glu Ala Leu Val Phe Ala Thr Gly Gly Val Arg
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Ala Arg Val Arg Val Gly Glu Gly Leu Ser Asp Pro Gly Ala Leu Ser
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Pro Gly Asp Tyr Leu Ile His Pro Glu His Gly Val Gly Gln Tyr Leu
325 330 335

Gly Leu Glu Thr Arg Glu Val Leu Gly Val Lys Arg Asp Tyr Leu Val
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Leu Arg Tyr Lys Gly Glu Gly Lys Leu Tyr Leu Pro Val Glu Gln Leu
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Pro Leu Leu Lys Arg His Pro Gly Thr Thr Asp Asp Pro Pro Glu Leu
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Ser Ser Leu Gly Lys Asn Glu Trp Gln Arg Ala Lys Glu Arg Ala Arg
385 390 395 400

Lys Asp Val Glu Glu Leu Ala Gly Arg Leu Leu Val Leu Gln Ala Lys
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Arg Lys Ala Thr Pro Gly Arg Ala Phe Pro Pro Leu Pro Glu Trp Asp
420 425 430

Pro Leu Val Glu Lys Gly Phe Pro Tyr Glu Leu Thr Pro Asp Gln Lys
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Arg Ala Leu Glu Glu Val Leu Arg Asp Leu Glu Ser Pro His Pro Met
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Asp Arg Leu Val Ser Gly Asp Val Gly Phe Gly Lys Thr Glu Val Ala
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Leu Arg Ala Ala His Arg Val Val Gly His Gly Ala Gln Val Ala Phe
485 490 495

Leu Gly Pro Thr Thr Leu Leu Ala Glu Gln His Gly Lys Thr Phe Arg
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Glu Arg Phe Gln Gly Leu Pro Val Arg Val Ala Val Leu Ser Arg Phe
515 520 525

Thr Pro Pro Lys Glu Glu Ala Ile Leu Lys Gly Leu Ala Glu Gly
530 535 540

Thr Val Asp Ile Val Ile Gly Thr His Arg Leu Leu Gln Glu Asp Val
545 550 555 560

Arg Phe Arg Asp Leu Gly Leu Leu Ile Val Asp Glu Glu His Arg Phe
565 570 575

Gly Val Ala Gln Lys Glu Arg Ile Arg Glu Leu Lys Ala Glu Val Asp
580 585 590

Thr Leu Tyr Leu Ser Ala Thr Pro Ile Pro Arg Thr Leu Tyr Ser Ala
595 600 605

Leu Val Gly Leu Lys Asp Leu Ser Ser Ile Gln Thr Pro Pro Pro Gly
610 615 620

Arg Lys Pro Ile Lys Thr Phe Leu Ala Pro Phe Asp Pro Leu Leu Val
625 630 635 640

Arg Glu Ala Ile Leu Phe Glu Leu Glu Arg Gly Gly Lys Val Phe Tyr
645 650 655

Val His Asp Arg Val Ala Ser Ile Glu Ala Arg Arg Arg Phe Leu Glu
660 665 670

Asn Leu Val Pro Glu Ala Arg Ile Gly Val Val His Gly Gln Met Pro
675 680 685

Glu Ser Leu Ile Glu Glu Thr Met Leu Leu Phe Ala Glu Gly Ala Tyr

690

695

700

Asp Val Leu Leu Ala Thr Thr Ile Ile Glu Ala Gly Leu Asp Val Pro
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Glu Ala Asn Thr Ile Leu Ile Glu Arg Ala Asp Arg Leu Gly Leu Ala
725 730 735

Thr Leu Tyr Gln Leu Arg Gly Arg Val Gly Arg Arg Glu Glu Glu Ala
740 745 750

Tyr Ala Tyr Leu Phe His Pro Pro Arg Leu Thr Glu Ala Ala Glu Lys
755 760 765

Arg Leu Ala Ala Ile Ala Asp Leu Ser Asp Leu Gly Ser Gly His Leu
770 775 780

Leu Ala Glu Arg Asp Met Glu Ile Arg Gly Val Gly Asn Leu Leu Gly
785 790 795 800

Pro Glu Gln His Gly His Ile Arg Ala Leu Ser Leu Glu Val Tyr Thr
805 810 815

Glu Leu Leu Glu Glu Ala Ile Arg Lys Leu Lys Gly Glu Ala Lys Glu
820 825 830

Glu Arg Arg His Val Thr Leu Asp Leu Ala Leu Ser Ala Arg Leu Pro
835 840 845

Ala Glu Tyr Val Gly Ser Leu Glu Ala Arg Ser Arg Tyr Tyr Ser Arg
850 855 860

Phe Ala Glu Ala Lys Ser Leu Ala Glu Leu Ser Arg Leu Val Arg Glu
865 870 875 880

Leu Lys Glu Arg Tyr Gly Pro Leu Pro Glu Glu Ala Glu Asn Phe Val
885 890 895

Ala Leu Ala Arg Leu Arg Leu Val Ala Glu Arg Lys Gly Val Val Ser
900 905 910

Ile Thr Glu Gly Leu Thr His Leu Glu Val Val Phe Pro Arg Tyr Pro
915 920 925

Leu Asp Tyr Asp Ala Arg Gly Leu Lys Gly Leu Pro Tyr Arg Val Glu
930 935 940

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Leu Thr Gln Tyr Pro Pro Gly Phe Arg Leu Glu Lys Lys Gly Leu Arg
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Asp Leu

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11283-013001.ST25.txt

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41

<210> 18

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<223> n is a, c, g, or t

<400> 19

ttctcgccac gttcgccgaa ttccgntttc cccgtcaaga tctaa

45

<210> 20

<211> 485

<212> PRT

<213> Homo sapiens

<400> 20

Cys Asp Gly Leu Ala Arg Gln Pro Glu Glu Val Val Leu Gln Ala Ser
1 5 10 15Val Ser Ser Tyr His Leu Phe Arg Asp Val Ala Glu Val Thr Ala Phe
20 25 30Arg Gly Ser Leu Leu Ser Trp Tyr Asp Gln Glu Lys Arg Asp Leu Pro
35 40 45Trp Arg Arg Ala Glu Asp Glu Met Asp Leu Asp Arg Arg Ala Tyr
50 55 60Ala Val Trp Val Ser Glu Val Met Leu Gln Gln Thr Gln Val Ala Thr
65 70 75 80Val Ile Asn Tyr Tyr Gly Trp Met Gln Lys Trp Pro Thr Leu Gln
85 90 95Asp Leu Ala Ser Ala Ser Leu Glu Glu Val Asn Gln Leu Trp Ala Gly
100 105 110Leu Gly Tyr Tyr Ser Arg Gly Arg Arg Leu Gln Glu Gly Ala Arg Lys
115 120 125

11283-013001.ST25.txt

Val Val Glu Glu Leu Gly Gly His Met Pro Arg Thr Ala Glu Thr Leu
 130 135 140

Gln Gln Leu Leu Pro Gly Val Gly Arg Tyr Thr Ala Gly Ala Ile Ala
 145 150 155 160

Ser Ile Ala Phe Gly Gln Ala Thr Gly Val Val Asp Gly Asn Val Ala
 165 170 175

Arg Val Leu Cys Arg Val Arg Ala Ile Gly Ala Asp Pro Ser Ser Thr
 180 185 190

Leu Val Ser Gln Gln Leu Trp Gly Leu Ala Gln Gln Leu Val Asp Pro
 195 200 205

Ala Arg Pro Gly Asp Phe Asn Gln Ala Ala Met Glu Leu Gly Ala Thr
 210 215 220

Val Cys Thr Pro Gln Arg Pro Leu Cys Ser Gln Cys Pro Val Glu Ser
 225 230 235 240

Leu Cys Arg Ala Arg Gln Arg Val Glu Gln Glu Gln Leu Leu Ala Ser
 245 250 255

Gly Ser Leu Ser Gly Ser Pro Asp Val Glu Glu Cys Ala Pro Asn Thr
 260 265 270

Gly Gln Cys His Leu Cys Leu Pro Pro Ser Glu Pro Trp Asp Gln Thr
 275 280 285

Leu Gly Val Val Asn Phe Pro Arg Lys Ala Ser Arg Lys Pro Pro Arg
 290 295 300

Glu Glu Ser Ser Ala Thr Cys Val Leu Glu Gln Pro Gly Ala Leu Gly
 305 310 315 320

Ala Gln Ile Leu Leu Val Gln Arg Pro Asn Ser Gly Leu Leu Ala Gly
 325 330 335

Leu Trp Glu Phe Pro Ser Val Thr Trp Glu Pro Ser Glu Gln Leu Gln
 340 345 350

Arg Lys Ala Leu Leu Gln Glu Leu Gln Arg Trp Ala Gly Pro Leu Pro
 355 360 365

Ala Thr His Leu Arg His Leu Gly Glu Val Val His Thr Phe Ser His
 370 375 380

11283-013001.ST25.txt

Ile Lys Leu Thr Tyr Gln Val Tyr Gly Leu Ala Leu Glu Gly Gln Thr
385 390 395 400

Pro Val Thr Thr Val Pro Pro Gly Ala Arg Trp Leu Thr Gln Glu Glu
405 410 415

Phe His Thr Ala Ala Val Ser Thr Ala Met Lys Lys Val Phe Arg Val
420 425 430

Tyr Gln Gly Gln Gln Pro Gly Thr Cys Met Gly Ser Lys Arg Ser Gln
435 440 445

Val Ser Ser Pro Cys Ser Arg Lys Lys Pro Arg Met Gly Gln Gln Val
450 455 460

Leu Asp Asn Phe Phe Arg Ser His Ile Ser Thr Asp Ala His Ser Leu
465 470 475 480

Asn Ser Ala Ala Gln
485

<210> 21
<211> 461
<212> PRT
<213> Schizosaccharomyces pombe

<400> 21

Met Ser Asp Ser Asn His Phe Leu Asp Leu His Ser Tyr Thr Gln Leu
1 5 10 15

Glu Val Glu Arg Phe Arg Glu Ser Leu Ile Gln Phe Tyr Asp Lys Thr
20 25 30

Lys Arg Ile Leu Pro Trp Arg Lys Lys Glu Cys Ile Pro Pro Ser Glu
35 40 45

Asp Ser Pro Leu Glu Asp Trp Glu Gln Pro Val Gln Arg Leu Tyr Glu
50 55 60

Val Leu Val Ser Glu Ile Met Leu Gln Gln Thr Arg Val Glu Thr Val
65 70 75 80

Lys Arg Tyr Tyr Thr Lys Trp Met Glu Thr Leu Pro Thr Leu Lys Ser
85 90 95

Cys Ala Glu Ala Glu Tyr Asn Thr Gln Val Met Pro Leu Trp Ser Gly
100 105 110

11283-013001.ST25.txt

Met Gly Phe Tyr Thr Arg Cys Lys Arg Leu His Gln Ala Cys Gln His
115 120 125

Leu Ala Lys Leu His Pro Ser Glu Ile Pro Arg Thr Gly Asp Glu Trp
130 135 140

Ala Lys Gly Ile Pro Gly Val Gly Pro Tyr Thr Ala Gly Ala Val Leu
145 150 155 160

Ser Ile Ala Trp Lys Gln Pro Thr Gly Ile Val Asp Gly Asn Val Ile
165 170 175

Arg Val Leu Ser Arg Ala Leu Ala Ile His Ser Asp Cys Ser Lys Gly
180 185 190

Lys Ala Asn Ala Leu Ile Trp Lys Leu Ala Asn Glu Leu Val Asp Pro
195 200 205

Val Arg Pro Gly Asp Glu Asn Gln Ala Leu Met Glu Leu Gly Ala Ile
210 215 220

Thr Cys Thr Pro Gln Ser Pro Arg Cys Ser Val Cys Pro Ile Ser Glu
225 230 235 240

Ile Cys Lys Ala Tyr Gln Glu Gln Asn Val Ile Arg Asp Gly Asn Thr
245 250 255

Ile Lys Tyr Asp Ile Glu Asp Val Pro Cys Asn Ile Cys Ile Thr Asp
260 265 270

Ile Pro Ser Lys Glu Asp Leu Gln Asn Trp Val Val Ala Arg Tyr Pro
275 280 285

Val His Pro Ala Lys Thr Lys Gln Arg Glu Glu Arg Ala Leu Val Val
290 295 300

Ile Phe Gln Lys Thr Asp Pro Ser Thr Lys Glu Lys Phe Phe Leu Ile
305 310 315 320

Arg Lys Arg Pro Ser Ala Gly Leu Leu Ala Gly Leu Trp Asp Phe Pro
325 330 335

Thr Ile Glu Phe Gly Gln Glu Ser Trp Pro Lys Asp Met Asp Ala Glu
340 345 350

Phe Gln Lys Ser Ile Ala Gln Trp Ile Ser Asn Asp Ser Arg Ser Leu
355 360 365

11283-013001.ST25.txt

Ile Lys Lys Tyr Gln Ser Arg Gly Arg Tyr Leu His Ile Phe Ser His
370 375 380

Ile Arg Lys Thr Ser His Val Phe Tyr Ala Ile Ala Ser Pro Asp Ile
385 390 395 400

Val Thr Asn Glu Asp Phe Phe Trp Ile Ser Gln Ser Asp Leu Glu His
405 410 415

Val Gly Met Cys Glu Leu Gly Leu Lys Asn Tyr Arg Ala Ala Leu Glu
420 425 430

Ile Lys Lys Arg Lys Val Thr Ser Leu Ser Asn Phe Lys Glu Pro Lys
435 440 445

Leu Thr Ser Ala Arg Arg Ile Val Thr Lys Ala Glu Cys
450 455 460

<210> 22

<211> 350

<212> PRT

<213> Escherichia coli

<400> 22

Met Gln Ala Ser Gln Phe Ser Ala Gln Val Leu Asp Trp Tyr Asp Lys
1 5 10 15

Tyr Gly Arg Lys Thr Leu Pro Trp Gln Ile Asp Lys Thr Pro Tyr Lys
20 25 30

Val Trp Leu Ser Glu Val Met Leu Gln Gln Thr Gln Val Ala Thr Val
35 40 45

Ile Pro Tyr Phe Glu Arg Phe Met Ala Arg Phe Pro Thr Val Thr Asp
50 55 60

Leu Ala Asn Ala Pro Leu Asp Glu Val Leu His Leu Trp Thr Gly Leu
65 70 75 80

Gly Tyr Tyr Ala Arg Ala Arg Asn Leu His Lys Ala Ala Gln Gln Val
85 90 95

Ala Thr Leu His Gly Gly Lys Phe Pro Glu Thr Phe Glu Glu Val Ala
100 105 110

Ala Leu Pro Gly Val Gly Arg Ser Thr Ala Gly Ala Ile Leu Ser Leu
115 120 125

11283-013001.ST25.txt

Ser Leu Gly Lys His Phe Pro Ile Leu Asp Gly Asn Val Lys Arg Val
130 135 140

Leu Ala Arg Cys Tyr Ala Val Ser Gly Trp Pro Gly Lys Lys Glu Val
145 150 155 160

Glu Asn Lys Leu Trp Ser Leu Ser Glu Gln Val Thr Pro Ala Val Gly
165 170 175

Val Glu Arg Phe Asn Gln Ala Met Met Asp Leu Gly Ala Met Ile Cys
180 185 190

Thr Arg Ser Lys Pro Lys Cys Ser Leu Cys Pro Leu Gln Asn Gly Cys
195 200 205

Ile Ala Ala Ala Asn Asn Ser Trp Ala Leu Tyr Pro Gly Lys Lys Pro
210 215 220

Lys Gln Thr Leu Pro Glu Arg Thr Gly Tyr Phe Leu Leu Leu Gln His
225 230 235 240

Glu Asp Glu Val Leu Leu Ala Gln Arg Pro Pro Ser Gly Leu Trp Gly
245 250 255

Gly Leu Tyr Cys Phe Pro Gln Phe Ala Asp Glu Glu Ser Leu Arg Gln
260 265 270

Trp Leu Ala Gln Arg Gln Ile Ala Ala Asp Asn Leu Thr Gln Leu Thr
275 280 285

Ala Phe Arg His Thr Phe Ser His Phe His Leu Asp Ile Val Pro Met
290 295 300

Trp Leu Pro Val Ser Ser Phe Thr Gly Cys Met Asp Glu Gly Asn Ala
305 310 315 320

Leu Trp Tyr Asn Leu Ala Gln Pro Pro Ser Val Gly Leu Ala Ala Pro
325 330 335

Val Glu Arg Leu Leu Gln Gln Leu Arg Thr Gly Ala Pro Val
340 345 350

<210> 23
<211> 211
<212> PRT
<213> Escherichia coli

11283-013001.ST25.txt

<400> 23

Met Asn Lys Ala Lys Arg Leu Glu Ile Leu Thr Arg Leu Arg Glu Asn
1 5 10 15

Asn Pro His Pro Thr Thr Glu Leu Asn Phe Ser Ser Pro Phe Glu Leu
20 25 30

Leu Ile Ala Val Leu Leu Ser Ala Gln Ala Thr Asp Val Ser Val Asn
35 40 45

Lys Ala Thr Ala Lys Leu Tyr Pro Val Ala Asn Thr Pro Ala Ala Met
50 55 60

Leu Glu Leu Gly Val Glu Gly Val Lys Thr Tyr Ile Lys Thr Ile Gly
65 70 75 80

Leu Tyr Asn Ser Lys Ala Glu Asn Ile Ile Lys Thr Cys Arg Ile Leu
85 90 95

Leu Glu Gln His Asn Gly Glu Val Pro Glu Asp Arg Ala Ala Leu Glu
100 105 110

Ala Leu Pro Gly Val Gly Arg Lys Thr Ala Asn Val Val Leu Asn Thr
115 120 125

Ala Phe Gly Trp Pro Thr Ile Ala Val Asp Thr His Ile Phe Arg Val
130 135 140

Cys Asn Arg Thr Gln Phe Ala Pro Gly Lys Asn Val Glu Gln Val Glu
145 150 155 160

Glu Lys Leu Leu Lys Val Val Pro Ala Glu Phe Lys Val Asp Cys His
165 170 175

His Trp Leu Ile Leu His Gly Arg Tyr Thr Cys Ile Ala Arg Lys Pro
180 185 190

Arg Cys Gly Ser Cys Ile Ile Glu Asp Leu Cys Glu Tyr Lys Glu Lys
195 200 205

Val Asp Ile
210

<210> 24
<211> 28
<212> PRT
<213> *Thermus thermophilus*

11283-013001.ST25.txt

<400> 24

Lys Arg Ile Arg Val His Gly Asp Tyr Asp Ala Asp Gly Leu Thr Gly
1 5 10 15

Thr Ala Ile Leu Val Arg Gly Leu Ala Ala Leu Gly
20 25

<210> 25

<211> 28

<212> PRT

<213> escherichia coli

<400> 25

Thr Arg Ile Ile Val Val Gly Asp Phe Asp Ala Asp Gly Ala Thr Ser
1 5 10 15

Thr Ala Leu Ser Val Leu Ala Met Arg Ser Leu Gly
20 25

<210> 26

<211> 28

<212> PRT

<213> aquifex aeolicus

<400> 26

Lys Arg Ile Ile Ile Tyr Gly Asp Tyr Asp Val Asp Gly Ile Thr Gly
1 5 10 15

Thr Ala Ile Leu Tyr Arg Val Leu Lys Leu Leu Gly
20 25

<210> 27

<211> 28

<212> PRT

<213> helicobacter pylori

<400> 27

Thr Glu Ile Leu Val Val Gly Asp Tyr Asp Ala Asp Gly Val Ile Ser
1 5 10 15

Ser Ala Ile Met Ala Lys Phe Phe Glu Ser Leu Asn
20 25

<210> 28

<211> 28

<212> PRT

<213> Haemophilus influenzae

<400> 28

Gln Lys Ile Val Ile Val Gly Asp Phe Asp Ala Asp Gly Ala Thr Ser

Thr Ala Leu Ser Val Leu Ala Leu Arg Gln Leu Gly
20 25

<210> 29
<211> 28
<212> PRT
<213> *saccharomyces cerevisiae*

<400> 29

Thr Ile Cys Val Gly Asn Glu Ser Ala Asp Met Asp Ser Ile Ala Ser
1 5 10 15

Ala Ile Thr Tyr Ser Tyr Cys Gln Tyr Ile Tyr Asn
20 25

<210> 30
<211> 28
<212> PRT
<213> *drosophila melanogaster*

<400> 30

His Leu Val Met Gly Asn Glu Ser Cys Asp Leu Asp Ser Ala Val Ser
1 5 10 15

Ala Val Thr Leu Ala Phe Val Tyr Ala Ala Ser Ser
20 25

<210> 31
<211> 19
<212> PRT
<213> *thermus thermophilus*

<400> 31

Ser Asp Leu Phe Leu Thr Val Asp Cys Gly Ile Thr Asn His Ala Glu
1 5 10 15

Leu Arg Glu

<210> 32
<211> 19
<212> PRT
<213> *escherichia coli*
<400> 32

Ala Gln Leu Ile Val Thr Val Asp Asn Gly Ile Ser Ser His Ala Gly
1 5 10 15

11283-013001.ST25.txt

Val Glu His

<210> 33
<211> 19
<212> PRT
<213> aquifex aeolicus

<400> 33

Gly Asp Phe Leu Ile Thr Val Asp Asn Gly Thr Ser Ala Val Glu Glu
1 5 10 15

Ile Asp Gln

<210> 34
<211> 19
<212> PRT
<213> helicobacter pylori

<400> 34

Ala Pro Leu Ile Ile Thr Val Asp Asn Gly Ile Asn Ala Phe Glu Ala
1 5 10 15

Ala Arg Phe

<210> 35
<211> 19
<212> PRT
<213> haemophilus influenzae

<400> 35

Val Gln Leu Leu Met Thr Val Asp Asn Gly Val Ser Ser Phe Asp Gly
1 5 10 15

Val Ala Phe

<210> 36
<211> 19
<212> PRT
<213> saccharomyces cerevisiae

<400> 36

Glu Leu Asn Ser Tyr Leu Val Asp Asn Asn Asp Thr Pro Lys Asn Leu
1 5 10 15

Lys Asn Tyr

11283-013001.ST25.txt

<210> 37
<211> 19
<212> PRT
<213> *drosophila melanogaster*

<400> 37

Pro Leu Val Cys Glu Met Trp Asp Cys Arg Ala Arg Val Ala Leu Pro
1 5 10 15

Arg Arg Tyr

<210> 38
<211> 13
<212> PRT
<213> *thermus thermophilus*

<400> 38

Val Glu Val Ile Val Thr Asp His His Thr Pro Gly Lys
1 5 10

<210> 39
<211> 13
<212> PRT
<213> *escherichia coli*

<400> 39

Ile Pro Val Ile Val Thr Asp His His Leu Pro Gly Asp
1 5 10

<210> 40
<211> 13
<212> PRT
<213> *aquifex aeolicus*

<400> 40

Leu Glu Thr Val Val Ile Asp His His Asn Val Pro Pro
1 5 10

<210> 41
<211> 13
<212> PRT
<213> *helicobacter pylori*

<400> 41

Tyr Thr Leu Ile Ile Thr Asp His His Cys Leu His His
1 5 10

<210> 42
<211> 13
<212> PRT

11283-013001.ST25.txt

<213> haemophilus influenzae

<400> 42

Ile Arg Val Leu Val Thr Asp His His Leu Pro Pro Glu
1 5 10

<210> 43

<211> 13

<212> PRT

<213> saccharomyces cerevisiae

<400> 43

Asn Val Val Gly Ile Ile Asp His His Phe Asp Leu Gln
1 5 10

<210> 44

<211> 13

<212> PRT

<213> drosophila melanogaster

<400> 44

Asn Val Ile Glu Ile Leu Asp His Arg Pro Leu Glu Asp
1 5 10

<210> 45

<211> 19

<212> PRT

<213> thermus thermophilus

<400> 45

Tyr Ala Asp Leu Ala Ala Val Gly Thr Ile Ala Asp Val Ala Pro Leu
1 5 10 15

Trp Gly Trp

<210> 46

<211> 19

<212> PRT

<213> escherichia coli

<400> 46

Leu Leu Asp Leu Val Ala Leu Gly Thr Val Ala Asp Val Val Pro Leu
1 5 10 15

Asp Ala Asn

<210> 47

<211> 19

<212> PRT

11283-013001.ST25.txt

<213> *aquifex aeolicus*

<400> 47

Phe Leu Asp Leu Val Ala Leu Gly Leu Leu Ala Asp Tyr Met Pro Val
1 5 10 15

Asn Pro Val

<210> 48

<211> 19

<212> PRT

<213> *helicobacter pylori*

<400> 48

Leu Leu Cys Leu Ala Gly Val Ala Thr Ile Ala Asp Met Met Pro Leu
1 5 10 15

Thr Phe Phe

<210> 49

<211> 19

<212> PRT

<213> *haemophilus influenzae*

<400> 49

Leu Leu Asp Leu Val Ala Leu Gly Thr Ile Ala Asp Val Val Pro Leu
1 5 10 15

Asp Gln Asn

<210> 50

<211> 19

<212> PRT

<213> *saccharomyces cerevisiae*

<400> 50

Ile Ala Leu Leu Leu Met Gly Ala Ile Leu Ile Asp Thr Ser Asn Met
1 5 10 15

Arg Arg Lys

<210> 51

<211> 19

<212> PRT

<213> *drosophila melanogaster*

<400> 51

11283-013001.ST25.txt

Val Ala Gln Leu Leu His Ala Thr Ile Val Leu Asp Thr Ile Asn Phe
1 5 10 15

Ala Pro Ala

<210> 52
<211> 17
<212> PRT
<213> *thermus thermophilus*

<400> 52

Asp Leu Leu Leu Arg Tyr Gly Gly His Lys Glu Ala Ala Gly Phe Ala
1 5 10 15

Met

<210> 53
<211> 17
<212> PRT
<213> *escherichia coli*

<400> 53

Gly Met Met Leu Lys Phe Gly Gly His Ala Met Ala Ala Gly Leu Ser
1 5 10 15

Leu

<210> 54
<211> 17
<212> PRT
<213> *aquifex aeolicus*

<400> 54

Asp Met Phe Leu Lys Trp Gly Gly His Asp Lys Ala Met Gly Leu Thr
1 5 10 15

Leu

<210> 55
<211> 17
<212> PRT
<213> *helicobacter pylori*

<400> 55

Ser Leu Leu Leu Gly Tyr Gly Gly His Arg Gln Ala Cys Gly Leu Ser
1 5 10 15

11283-013001.ST25.txt

val

<210> 56
<211> 17
<212> PRT
<213> haemophilus influenzae

<400> 56

Asn Met Ile Leu Lys Phe Gly Gly His Ala Met Ala Ala Gly Leu Ser
1 5 10 15

ile

<210> 57
<211> 49
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic DNA

<400> 57

actacttggt acactgacgc gagcacgcag gagctcattc cagtgcgca 49

<210> 58
<211> 343
<212> PRT
<213> Thermus thermophilus

<400> 58

Met Arg Leu Leu Leu Phe Arg Gln Arg Asn Phe Arg Asn Leu Ala Leu
1 5 10 15

Glu Ala Tyr Arg Pro Pro Pro Gly Leu Ser Ala Leu Val Gly Ala Asn
20 25 30

Ala Gln Gly Lys Thr Ser Leu Leu Leu Gly Ile His Leu Ala Leu Gly
35 40 45

Gly Glu Val Pro Leu Gly Leu Ala Asp Leu Val Arg Phe Gly Glu Glu
50 55 60

Glu Ala Trp Leu His Ala Glu Val Glu Thr Glu Leu Gly Ala Tyr Arg
65 70 75 80

Leu Glu His Arg Leu Gly Pro Gly Gly Arg Glu Val Leu Leu Asn Gly
85 90 95

11283-013001.ST25.txt

Lys Arg Val Ser Leu Arg Thr Leu Trp Glu Leu Pro Gly Ser Val Leu
100 105 110

Val Ser Pro Leu Asp Leu Glu Ala Val Leu Gly Pro Lys Glu Glu Arg
115 120 125

Arg Ala Tyr Leu Asp Arg Leu Ile Ala His Phe Ser Arg Arg Tyr Ala
130 135 140

Ala Leu Leu Ser Ala Tyr Glu Lys Ala Leu Arg Gln Arg Asn Ala Leu
145 150 155 160

Leu Lys Ala Gly Gly Glu Gly Leu Ser Ala Trp Asp Arg Glu Leu Ala
165 170 175

Arg Tyr Gly Asp Glu Ile Val Ala Leu Arg Arg Arg Phe Leu Arg Arg
180 185 190

Phe Ala Pro Ile Leu Arg Glu Val His Ala Ala Leu Ala Ala Lys Glu
195 200 205

Ala Gly Leu Arg Leu Glu Glu Thr Ala Gly Glu Gly Val Leu Arg Ala
210 215 220

Leu Glu Ala Ser Arg Ala Glu Glu Arg Glu Arg Gly Gln Thr Leu Val
225 230 235 240

Gly Pro His Arg Asp Asp Leu Val Phe Leu Leu Glu Gly Arg Pro Ala
245 250 255

His Arg Phe Ala Ser Arg Gly Glu Ala Lys Thr Leu Ala Leu Ala Leu
260 265 270

Arg Leu Ala Glu His Arg Leu Leu Gly Glu His His Gly Glu Pro Pro
275 280 285

Leu Leu Leu Val Asp Glu Trp Gly Glu Glu Leu Asp Glu Ala Arg Arg
290 295 300

Arg Ala Val Leu Ala Tyr Ala Gln Ala Leu Pro Gln Ala Ile Leu Ala
305 310 315 320

Gly Leu Glu Ala Pro Pro Gly Val Pro Val Cys Ser Val Val Arg Gly
325 330 335

Val Val Leu Cys Pro Gly Ala
340

11283-013001.ST25.txt

<210> 59
<211> 357
<212> PRT
<213> Escherichia coli

<400> 59

Met Ser Leu Thr Arg Leu Leu Ile Arg Asp Phe Arg Asn Ile Glu Thr
1 5 10 15

Ala Asp Leu Ala Leu Ser Pro Gly Phe Asn Phe Leu Val Gly Ala Asn
20 25 30

Gly Ser Gly Lys Thr Ser Val Leu Glu Ala Ile Tyr Thr Leu Gly His
35 40 45

Gly Arg Ala Phe Arg Ser Leu Gln Ile Gly Arg Val Ile Arg His Glu
50 55 60

Gln Glu Ala Phe Val Leu His Gly Arg Leu Gln Gly Glu Glu Arg Glu
65 70 75 80

Thr Ala Ile Gly Leu Thr Lys Asp Lys Gln Gly Asp Ser Lys Val Arg
85 90 95

Ile Asp Gly Thr Asp Gly His Lys Val Ala Glu Leu Ala His Leu Met
100 105 110

Pro Met Gln Leu Ile Thr Pro Glu Gly Phe Thr Leu Leu Asn Gly Gly
115 120 125

Pro Lys Tyr Arg Arg Ala Phe Leu Asp Trp Gly Cys Phe His Asn Glu
130 135 140

Pro Gly Phe Phe Thr Ala Trp Ser Asn Leu Lys Arg Leu Leu Lys Gln
145 150 155 160

Arg Asn Ala Ala Leu Arg Gln Val Thr Arg Tyr Glu Gln Leu Arg Pro
165 170 175

Trp Asp Lys Glu Leu Ile Pro Leu Ala Glu Gln Ile Ser Thr Trp Arg
180 185 190

Ala Glu Tyr Ser Ala Gly Ile Ala Ala Asp Met Ala Asp Thr Cys Lys
195 200 205

Gln Phe Leu Pro Glu Phe Ser Leu Thr Phe Ser Phe Gln Arg Gly Trp
210 215 220

11283-013001.ST25.txt

Glu Lys Glu Thr Glu Tyr Ala Glu Val Leu Glu Arg Asn Phe Glu Arg
225 230 235 240

Asp Arg Gln Leu Thr Tyr Thr Ala His Gly Pro His Lys Ala Asp Leu
245 250 255

Arg Ile Arg Ala Asp Gly Ala Pro Val Glu Asp Thr Leu Ser Arg Gly
260 265 270

Gln Leu Lys Leu Leu Met Cys Ala Leu Arg Leu Ala Gln Gly Glu Phe
275 280 285

Leu Thr Arg Glu Ser Gly Arg Arg Cys Leu Tyr Leu Ile Asp Asp Phe
290 295 300

Ala Ser Glu Leu Asp Asp Glu Arg Arg Gly Leu Leu Ala Ser Arg Leu
305 310 315 320

Lys Ala Thr Gln Ser Gln Val Phe Val Ser Ala Ile Ser Ala Glu His
325 330 335

Val Ile Asp Met Ser Asp Glu Asn Ser Lys Met Phe Thr Val Glu Lys
340 345 350

Gly Lys Ile Thr Asp
355

<210> 60
<211> 233
<212> PRT
<213> *Pseudomonas putida*

<400> 60

Met Ser Leu Arg Arg Ile Met Val Thr Ala Val Arg Asn Leu His Pro
1 5 10 15

Val Thr Leu Leu Pro Ser Pro Arg Ile Asn Ile Leu Tyr Gly Ala Asn
20 25 30

Gly Ser Gly Lys Thr Ser Val Leu Glu Ala Val His Leu Leu Gly Leu
35 40 45

Ala Arg Ser Phe Arg Ser Thr Arg Leu Asn Pro Val Ile Gln Tyr Glu
50 55 60

Gln Ala Ala Cys Thr Val Phe Gly Glu Val Gln Leu Thr Glu Gly Gly
65 70 75 80

11283-013001.ST25.txt

Thr Ser Asn Leu Gly Val Ser Arg Glu Arg Gln Gly Glu Phe Thr Ile
85 90 95

Arg Ile Asp Ala Leu Lys Pro Val Phe Glu Arg Thr Leu Ser Glu Leu
100 105 110

Val Glu Leu Asp Gly Leu Thr Leu Ser Tyr Tyr Arg Gly Trp Asp Lys
115 120 125

Asp Arg Glu Leu Gln Glu Val Leu Ala Ser Ser Leu Leu Arg Asp Gln
130 135 140

Gln Met Gly His Thr Gln Ala Gly Pro Gln Arg Ala Asp Leu Arg Leu
145 150 155 160

Arg Leu Ala Gly Asn Asn Ala Ala Asp Ile Leu Ser Arg Gly Gln Gln
165 170 175

Lys Leu Val Val Cys Ala Leu Arg Ile Ala Gln Gly His Leu Val Ser
180 185 190

Gln Ala Arg Arg Gly His Cys Ile Tyr Leu Val Asp Asp Leu Pro Ser
195 200 205

Glu Leu Asp Asp Gln His Arg Arg Ala Leu Cys Arg Leu Leu Glu Glu
210 215 220

Leu Arg Cys Gln Cys Ser Ser Pro Val
225 230

<210> 61
<211> 370
<212> PRT
<213> *Bacillus subtilis*

<400> 61

Met Tyr Ile Gln Asn Leu Glu Leu Thr Ser Tyr Arg Asn Tyr Asp His
1 5 10 15

Ala Glu Leu Gln Phe Glu Asn Lys Val Asn Val Ile Ile Gly Glu Asn
20 25 30

Ala Gln Gly Lys Thr Asn Leu Met Glu Ala Ile Tyr Val Leu Ser Met
35 40 45

Ala Lys Ser His Arg Thr Ser Asn Asp Lys Glu Leu Ile Arg Trp Asp
50 55 60

11283-013001.ST25.txt

Lys Asp Tyr Ala Lys Ile Glu Gly Arg Val Met Lys Gln Asn Gly Ala
65 70 75 80

Ile Pro Met Gln Leu Val Ile Ser Lys Lys Gly Lys Lys Gly Lys Val
85 90 95

Asn His Ile Glu Gln Gln Lys Leu Ser Gln Tyr Val Gly Ala Leu Asn
100 105 110

Thr Ile Met Phe Ala Pro Glu Asp Leu Asn Leu Val Lys Gly Ser Pro
115 120 125

Gln Val Arg Arg Arg Phe Leu Asp Met Glu Ile Gly Gln Val Ser Pro
130 135 140

Val Tyr Leu His Asp Leu Ser Leu Tyr Gln Lys Ile Leu Ser Gln Arg
145 150 155 160

Asn His Phe Leu Lys Gln Leu Gln Thr Arg Lys Gln Thr Asp Arg Thr
165 170 175

Met Leu Asp Val Leu Thr Asp Gln Leu Val Glu Val Ala Ala Lys Val
180 185 190

Val Val Lys Arg Leu Gln Phe Thr Ala Gln Leu Glu Lys Trp Ala Gln
195 200 205

Pro Ile His Ala Gly Ile Ser Arg Gly Leu Glu Glu Leu Thr Leu Lys
210 215 220

Tyr His Thr Ala Leu Asp Val Ser Asp Pro Leu Asp Leu Ser Lys Ile
225 230 235 240

Gly Asp Ser Tyr Gln Glu Ala Phe Ser Lys Leu Arg Glu Lys Glu Ile
245 250 255

Glu Arg Gly Val Thr Leu Ser Gly Pro His Arg Asp Asp Val Leu Phe
260 265 270

Tyr Val Asn Gly Arg Asp Val Gln Thr Tyr Gly Ser Gln Gly Gln Gln
275 280 285

Arg Thr Thr Ala Leu Ser Leu Lys Leu Ala Glu Ile Asp Leu Ile His
290 295 300

Glu Glu Ile Gly Glu Tyr Pro Ile Leu Leu Leu Asp Asp Val Leu Ser

305

310

315

320

Glu Leu Asp Asp Tyr Arg Gln Ser His Leu Leu His Thr Ile Gln Gly
 325 330 335

Arg Val Gln Thr Phe Val Thr Thr Ser Val Asp Gly Ile Asp His
 340 345 350

Glu Thr Leu Arg Gln Ala Gly Met Phe Arg Val Gln Asn Gly Ala Leu
 355 360 365

Val Lys
 370

<210> 62
 <211> 385
 <212> PRT
 <213> *Mycobacterium tuberculosis*

<400> 62

Met Tyr Val Arg His Leu Gly Leu Arg Asp Phe Arg Ser Trp Ala Cys
 1 5 10 15

Val Asp Leu Glu Leu His Pro Gly Arg Thr Val Phe Val Gly Pro Asn
 20 25 30

Gly Tyr Gly Lys Thr Asn Leu Ile Glu Ala Leu Trp Tyr Ser Thr Thr
 35 40 45

Leu Gly Ser His Arg Val Ser Ala Asp Leu Pro Leu Ile Arg Val Gly
 50 55 60

Thr Asp Arg Ala Val Ile Ser Thr Ile Val Val Asn Asp Gly Arg Glu
 65 70 75 80

Cys Ala Val Asp Leu Glu Ile Ala Thr Gly Arg Val Asn Lys Ala Arg
 85 90 95

Leu Asn Arg Ser Ser Val Arg Ser Thr Arg Asp Val Val Gly Val Leu
 100 105 110

Arg Ala Val Leu Phe Ala Pro Glu Asp Leu Gly Leu Val Arg Gly Asp
 115 120 125

Pro Ala Asp Arg Arg Arg Tyr Leu Asp Asp Leu Ala Ile Val Arg Arg
 130 135 140

Pro Ala Ile Ala Ala Val Arg Ala Glu Tyr Glu Arg Val Leu Arg Gln
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145 150 155 160

Arg Thr Ala Leu Leu Lys Ser Val Pro Gly Ala Arg Tyr Arg Gly Asp
165 170 175

Arg Gly Val Phe Asp Thr Leu Asp Leu Trp Asp Ser Arg Leu Ala Glu
180 185 190

His Gly Ala Glu Leu Val Ala Ala Arg Ile Asp Leu Val Asn Gln Leu
195 200 205

Ala Pro Glu Val Lys Lys Ala Tyr Gln Leu Leu Ala Pro Glu Ser Arg
210 215 220

Ser Ala Ser Ile Gly Tyr Arg Ala Ser Met Asp Val Thr Gly Pro Ser
225 230 235 240

Glu Gln Ser Asp Ile Asp Arg Gln Leu Leu Ala Ala Arg Leu Leu Ala
245 250 255

Ala Leu Ala Ala Arg Arg Asp Ala Glu Leu Glu Arg Gly Val Cys Leu
260 265 270

Val Gly Pro His Arg Asp Asp Leu Ile Leu Arg Leu Gly Asp Gln Pro
275 280 285

Ala Lys Gly Phe Ala Ser His Gly Glu Ala Trp Ser Leu Ala Val Ala
290 295 300

Leu Arg Leu Ala Ala Tyr Gln Leu Leu Arg Val Asp Gly Gly Glu Pro
305 310 315 320

Val Leu Leu Leu Asp Asp Val Phe Ala Glu Leu Asp Val Met Arg Arg
325 330 335

Arg Ala Leu Ala Thr Ala Ala Glu Ser Ala Glu Gln Val Leu Val Thr
340 345 350

Ala Ala Val Leu Glu Asp Ile Pro Ala Gly Trp Asp Ala Arg Arg Val
355 360 365

His Ile Asp Val Arg Ala Asp Asp Thr Gly Ser Met Ser Val Val Leu
370 375 380

Pro
385

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<210> 63
<211> 359
<212> PRT
<213> Deinococcus radiodurans

<400> 63

Met Gly Asp Val Arg Leu Ser Ala Leu Ser Thr Leu Asn Tyr Arg Asn
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Leu Ala Pro Gly Thr Leu Asn Phe Pro Glu Gly Val Thr Gly Ile Tyr
20 25 30

Gly Glu Asn Gly Ala Gly Lys Thr Asn Leu Leu Glu Ala Ala Tyr Leu
35 40 45

Ala Leu Thr Gly Gln Thr Asp Ala Pro Arg Ile Glu Gln Leu Ile Gln
50 55 60

Ala Gly Glu Thr Glu Ala Tyr Val Arg Ala Asp Leu Gln Gln Gly Gly
65 70 75 80

Ser Leu Ser Ile Gln Glu Val Gly Leu Gly Arg Gly Arg Arg Gln Leu
85 90 95

Lys Val Asp Gly Val Arg Ala Arg Thr Gly Asp Leu Pro Arg Gly Gly
100 105 110

Ala Val Trp Ile Arg Pro Glu Asp Ser Glu Leu Val Phe Gly Pro Pro
115 120 125

Ser Gly Arg Arg Ala Tyr Leu Asp Ser Leu Leu Ser Arg Leu Ser Ala
130 135 140

Arg Tyr Gly Glu Gln Leu Ser Arg Tyr Glu Arg Thr Val Ser Gln Arg
145 150 155 160

Asn Ala Ala Leu Arg Gly Gly Glu Trp Ala Met His Val Trp Asp
165 170 175

Asp Val Leu Leu Lys Leu Gly Thr Glu Ile Met Leu Phe Arg Arg Arg
180 185 190

Ala Leu Thr Arg Leu Asp Glu Leu Ala Arg Glu Ala Asn Ala Gln Leu
195 200 205

Gly Ser Arg Lys Thr Leu Ala Leu Thr Leu Thr Glu Ser Thr Ser Pro
210 215 220

Glu Thr Tyr Ala Ala Asp Leu Arg Gly Arg Arg Ala Glu Glu Leu Ala
 225 230 235 240

Arg Gly Ser Thr Val Thr Gly Pro His Arg Asp Asp Leu Leu Leu Thr
 245 250 255

Leu Gly Asp Phe Pro Ala Ser Asp Tyr Ala Ser Arg Gly Glu Gly Arg
 260 265 270

Thr Val Ala Leu Ala Leu Arg Arg Ala Glu Leu Glu Leu Leu Arg Glu
 275 280 285

Lys Phe Gly Glu Asp Pro Val Leu Leu Leu Asp Asp Phe Thr Ala Glu
 290 295 300

Leu Asp Pro His Arg Arg Gln Tyr Leu Leu Asp Leu Ala Ala Ser Val
 305 310 315 320

Pro Gln Ala Ile Val Thr Gly Thr Glu Leu Ala Pro Gly Ala Ala Leu
 325 330 335

Thr Leu Arg Ala Gln Ala Gly Arg Phe Thr Pro Val Ala Asp Glu Glu
 340 345 350

Met Gln Ala Glu Gly Thr Ala
 355

<210> 64

<211> 89

<212> PRT

<213> Artificial sequence

<220>

<223> UvrB-beta artificial fragment

<400> 64

Arg Asn Leu Val Val Glu Arg Gly Lys Pro Tyr Pro Arg Glu Val Leu
 1 5 10 15

Leu Glu Arg Leu Leu Glu Leu Gly Tyr Gln Arg Asn Asp Ile Asp Leu
 20 25 30

Ser Pro Gly Arg Phe Arg Ala Lys Gly Glu Val Leu Glu Ile Phe Pro
 35 40 45

Ala Tyr Glu Thr Glu Pro Ile Arg Val Glu Leu Phe Gly Asp Glu Val
 50 55 60

Glu Arg Ile Ser Gln Val His Pro Val Thr Gly Glu Arg Leu Arg Glu
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65

70

75

80

Leu Pro Gly Phe Val Leu Phe Pro Ala
85

<210> 65
<211> 87
<212> PRT
<213> Artificial sequence

<220>
<223> TRCF-beta artificial fragment

<400> 65

Trp Arg Leu Leu Leu Glu Val Gly Arg Ala Tyr Pro Arg Glu Ala Leu
1 5 10 15

Leu Ser Arg Leu Leu Lys Leu Gly Tyr Ala Arg Asp Glu Asp Tyr Arg
20 25 30

Val Leu Gly Glu Val Val Glu Leu Gly Glu Val Arg Leu Glu Phe Phe
35 40 45

Gly Asp Glu Leu Glu Arg Leu Val Val Arg Gly Glu Glu Arg Arg Arg
50 55 60

His Val Leu Leu Pro Lys Pro Gly Lys Ala Glu Gly Phe Thr Ser Lys
65 70 75 80

Lys Val Leu His Glu Pro Gly
85